

CLAIMS:

1. A method for detecting the presence or amount of docosahexaenoic acid (DHA) in a sample, optionally in the presence of other fatty acids, said method comprising

contacting a sample with a protein having differential binding specificity for DHA over other fatty acids under conditions where DHA will bind to the protein to form a DHA-protein complex; and

detecting binding between the protein and DHA from the sample.

10 2. The method of claim 1, wherein said step of detecting comprises detecting the DHA-protein complex.

3. The method of claim 2, wherein the DHA-protein complex is detected through binding by a protein or DNA aptamer specific for the complex.

15 4. The method of claim 1, wherein binding between the protein and DHA is detected by measuring bound and/or unbound DHA.

5. The method of claim 1, wherein said step of contacting is carried out in the presence of a labeled analog of DHA.

20 6. The method of claim 1, wherein the protein has an affinity for DHA that is at least half an order of magnitude greater than its affinity for other fatty acids.

7. The method of claim 1, wherein the protein is Brain Lipid Binding Protein (BLBP).

8. The method of claim 7, wherein the protein is BLBP produced recombinantly.

25 9. The method of claim 1, wherein the protein is immobilized.

10. The method of claim 1, wherein the sample comprises biological material.

30 11. The method of claim 10, wherein the biological material is selected from microorganisms, fractions of cells, fish tissue, mammalian tissue, and biological fluids.

12. ^{The} A method of claim 1, further comprising a step of hydrolyzing complex lipids to release DHA residues as free DHA.

13. The method of claim 12, wherein said hydrolyzing is non-enzymatic.
14. A kit for detection of DHA in a sample comprising:
 - a protein having differential binding specificity for DHA over other fatty acids; and
- 5 means for detecting formation of a complex between said protein and DHA.
15. The kit of claim 14, wherein said protein is BLBP.
16. The kit of claim 15, wherein said protein is produced recombinantly.
17. The kit of claim 14, further comprising reagent means for saponifying
- 10 complex lipids.
18. The kit of claim 14, wherein the protein is immobilized.
19. A recombinant fusion protein comprising at least a portion of the sequence of a fatty acid binding protein, wherein said recombinant protein specifically binds fatty acid.
- 15 20. The recombinant fusion protein of claim 19, wherein the fatty acid binding protein is BLBP.